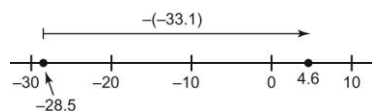


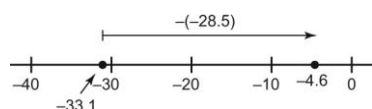
8. a) In degrees Celsius, the difference could be:

$$-28.5 - (-33.1) = 4.6$$



or, in degrees Celsius, the difference could be:

$$-(-33.1) - (-28.5) = -4.6$$



- b) There are two possible answers depending on the order in which we subtract the temperatures.

9. Strategies may vary.

For example: Write equivalent fractions with a common denominator.

$$\begin{aligned} \text{a) } \frac{17}{3} - \frac{19}{2} &= \frac{34}{6} - \frac{57}{6} \\ &= \frac{34 - 57}{6} \\ &= -\frac{23}{6} \\ &= -3\frac{5}{6} \end{aligned}$$

- b) Write equivalent fractions with a common denominator.

$$\begin{aligned} -\frac{13}{5} - \frac{7}{3} &= -\frac{39}{15} - \frac{35}{15} \\ &= \frac{-39 - 35}{15} \\ &= -\frac{74}{15} \\ &= -4\frac{14}{15} \end{aligned}$$

- c) Write each mixed number as an improper fraction.

$$\begin{aligned} 1\frac{5}{6} - 6\frac{3}{4} &= \frac{11}{6} - \frac{27}{4} \\ &= \frac{22}{12} - \frac{81}{12} \\ &= \frac{22 - 81}{12} \\ &= -\frac{59}{12} \\ &= -4\frac{11}{12} \end{aligned}$$

- d) Write equivalent fractions with a common denominator.

$$\begin{aligned} -\frac{19}{6} - \frac{7}{8} &= -\frac{76}{24} - \frac{21}{24} \\ &= \frac{-76 - 21}{24} \\ &= -\frac{97}{24} \\ &= -4\frac{1}{24} \end{aligned}$$

- e) Write equivalent fractions with a common denominator.

$$\begin{aligned} \frac{15}{4} - \frac{5}{12} &= \frac{45}{12} - \frac{5}{12} \\ &= \frac{45 - 5}{12} \\ &= \frac{40}{12} \\ &= \frac{10}{3} \\ &= 3\frac{1}{3} \end{aligned}$$

- f) Write each mixed number as an improper fraction.

$$\begin{aligned} -2\frac{1}{8} - \left(-4\frac{1}{3}\right) &= -\frac{17}{8} - \left(-\frac{13}{3}\right) \\ &= -\frac{51}{24} - \left(-\frac{104}{24}\right) \\ &= \frac{-51 + 104}{24} \\ &= \frac{53}{24}, \text{ or } 2\frac{5}{24} \end{aligned}$$

11. a) A distance measured above the sea level is positive.

A distance measured below the sea level is negative.

Sea level is represented as 0. Then, the distance in metres below sea level of the shore of the Dead Sea is -417.5 . The altitude in metres of the peak of Mt. Everest is 8844.43.

- b) The distance between the highest point and the lowest point represents the difference in heights:
 $8844.43 - (-417.5) = 9261.93$
 The distance is 9261.93 m.

13. Strategies may vary. For example:

a) $\frac{3}{5} - \left(-\frac{1}{2}\right) + \frac{2}{3}$ Write equivalent fractions with

the common denominator 30.

$$\frac{3}{5} = \frac{18}{30} \quad -\frac{1}{2} = -\frac{15}{30}$$

$$\frac{2}{3} = \frac{20}{30}$$

Then,

$$\begin{aligned} \frac{3}{5} - \left(-\frac{1}{2}\right) + \frac{2}{3} &= \frac{18}{30} - \left(-\frac{15}{30}\right) + \frac{20}{30} \\ &= \frac{18 - (-15) + 20}{30} \\ &= \frac{18 + 15 + 20}{30} \\ &= \frac{53}{30}, \text{ or } 1\frac{23}{30} \end{aligned}$$

b) $-2.34 + 8.6 + (-5.71)$

Add the first 2 terms: $-2.34 + 8.6 = 6.26$

Then add (-5.71) to the calculated sum: $6.26 + (-5.71) = 0.55$

c) $-\frac{16}{5} - \left(-\frac{14}{3}\right) + \frac{13}{4}$ Write equivalent fractions

with the common denominator 60.

$$\frac{16}{5} = \frac{192}{60} \quad -\frac{14}{3} = -\frac{280}{60}$$

$$\frac{13}{4} = \frac{195}{60}$$

$$\begin{aligned} -\frac{16}{5} - \left(-\frac{14}{3}\right) + \frac{13}{4} &= -\frac{192}{60} - \left(-\frac{280}{60}\right) + \frac{195}{60} \\ &= \frac{-192 - (-280) + 195}{60} \\ &= \frac{-192 + 280 + 195}{60} \\ &= \frac{283}{60}, \text{ or } 4\frac{43}{60} \end{aligned}$$

d) $23.5 + (-12.61) - 3.2$

Add the first 2 terms: $23.5 + (-12.61) = 10.89$

Then subtract 3.2 from the calculated sum:

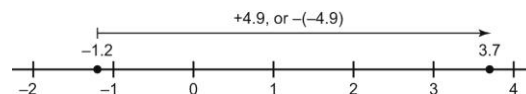
$$10.89 - 3.2 = 7.69$$

rational number less than or equal to 3.7?

Write and solve the corresponding subtraction equation:

$$-1.2 - \square = 3.7$$

Use a number line. To move from -1.2 to 3.7 , we move 4.9 units to the right.



Then, $\square = -4.9$

Any number greater than or equal to -4.9 will make the statement true.

Use a calculator to check the answer. Substitute:

$$\square = -4.8$$

$$-1.2 - (-4.8) = 3.6, \text{ which is less than } 3.7$$

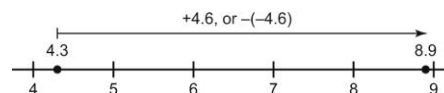
b) $4.3 - \square \geq 8.9$

Investigate: What do I subtract from 4.3 to get at least 8.9?

Write and solve the corresponding subtraction equation:

$$4.3 - \square = 8.9$$

Use a number line. To move from 4.3 to 8.9, we move 4.6 units to the right.



Then, $\square = -4.6$

Any number less than or equal to -4.6 will make the statement true.

Use a calculator to check the answer. Substitute:

$$\square = -4.7$$

$$4.3 - (-4.7) = 9, \text{ which is greater than } 8.9$$

c) $\square - 2.9 \geq 5.3$

Investigate: What do I subtract 2.9 from to get at least 5.3?

Write and solve the corresponding subtraction equation:

$$\square - 2.9 = 5.3$$

Then, $\square = 5.3 + 2.9$, or 8.2

Any number greater than or equal to 8.2 will make the statement true.

Use a calculator to check the answer. Substitute:

$$\square = 8.3$$

$$8.3 - 2.9 = 5.4, \text{ which is greater than } 5.3$$

14. a) $-1.2 - \square \leq 3.7$

Investigate: What do I subtract from -1.2 to get a

d) $\square - 7.2 \leq -10.9$

Investigate: What do I subtract 7.2 from to get a rational number less than or equal to -10.9 ?

Write and solve the corresponding subtraction equation:

$$\square - 7.2 = -10.9$$

Then, $\square = -10.9 + 7.2$, or -3.7

Any number less than or equal to -3.7 will make the statement true.

Use a calculator to check the answer. Substitute:

$$\square = -3.8$$

$-3.8 - 7.2 = -11.0$, which is less than -10.9

15. To determine the missing numbers in parts a and c, rewrite the statements as addition statements.

To determine the missing numbers in parts b, d, e, and f, rewrite the questions as related subtraction statements.

- a) To determine the missing number, add $37.3 + 28.4$. The missing number is 65.7 .

- b) To determine the missing number, subtract $\frac{9}{10} - \frac{3}{5}$. The missing number is $\frac{3}{10}$.

- c) To determine the missing number, add $-2.08 + 0.05$. The missing number is -2.03 .

- d) To determine the missing number, subtract $\frac{11}{6} - \left(-\frac{7}{3}\right)$. The missing number is $\frac{25}{6} = 4\frac{1}{6}$.

- e) To determine the missing number, subtract $-1.25 - 3.75$. The missing number is -5 .

- f) To determine the missing number, subtract $-3\frac{1}{2} - 5\frac{1}{4}$. The missing number is $-8\frac{3}{4}$.

16. a) $-7.4 + \square - \square = -10.9$

$$\begin{aligned}\square - \square &= -10.9 + 7.4 \\ &= -3.5\end{aligned}$$

Any 2 numbers with a difference of $-10.9 + 7.4 = -3.5$ will satisfy the equation.

For example: -4 and -0.5 , -1.2 and 2.3

b) $\square - (-12.8) + \square = -1.1$

$$\begin{aligned}\square + \square &= -1.1 + (-12.8) \\ &= -13.9\end{aligned}$$

Any 2 numbers with a sum of -13.9 will satisfy

the equation.

For example: -13 and -0.9 , -5.8 and -8.1

c) $-21.6 - \square - \square = -15.4$

$$-21.6 - (\square + \square) = -15.4$$

$$\begin{aligned}\square + \square &= 15.4 - 21.6 \\ &= -6.2\end{aligned}$$

Any 2 numbers with a sum of -6.2 will satisfy the equation.

For example: -4 and -2.2 , -8 and 1.8

17. a) $-11.8 - \square \leq 5.7$

Investigate: What number would I subtract from -11.8 to get less than or equal to 5.7 ?

Consider the equation: $-11.8 - \square = 5.7$

To determine the missing number, write the related subtraction equation:

$$\begin{aligned}\square &= -11.8 - 5.7 \\ &= -17.5\end{aligned}$$

So, any number greater than or equal to -17.5 will satisfy the expression $-11.8 - \square \leq 5.7$.

Check: Substitute: $\square = -10$.

$-11.8 - (-10) = -1.8$, which is less than 5.7

b) $6.3 - \square \geq 9.4$

Consider the equation $6.3 - \square = 9.4$. To determine the missing number, write the related subtraction equation:

$$\begin{aligned}\square &= 6.3 - 9.4 \\ &= -3.1\end{aligned}$$

So, any number less than or equal to -3.1 will satisfy the expression $6.3 - \square \geq 9.4$.

Check: Substitute: $\square = -4$

$6.3 - (-4) = 10.3$, which is greater than 9.4